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ABSTRACT

Autistic children are often said to lack a "theory of mind" (an implicit capacity which involves the person postulating the existence of mental states and then using these to explain and predict another person's behavior). Devoid of such a metarepresentational capacity, autistic individuals cannot symbolize the world around them and hence have impairments in pretend play, empathy, and social cognition. This Theory of Mind hypothesis implies that social deficits in autism are secondary in nature, i.e., resulting from other symptomatic features of the syndrome, and implies that some social behaviors may not be impaired in autism, specifically those social behaviors not demanding a metarepresentational capacity. Evidence is presented to indicate that, in contrast to predictions derived from the Theory of Mind hypothesis, social deficits in autism include very basic and early-emerging socially adaptive behaviors which are typically present in normally developing infants prior to the time at which even the most basic metarepresentational skills are thought to emerge. In addition, scores on the Socialization and Motor Skills domains of the Vineland Adaptive Behavior Scales (Revised) were lower for autistic children than for a nonautistic control group even when viewed relative to mental age. Thus, autistic social deficits are seen as being primary rather than secondary and pervasive or generalized rather than discrete. (Contains 25 references.) (JDD)

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Theory of mind deficits in autism: Social or Cognitive? Primary or Secondary?

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Paper presented at the 60th Meeting of the Society for Research in Child Development
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Theory of mind deficits in autism:

Social or Cognitive? Primary or Secondary?

The syndrome of infantile autism was first described fifty years ago by Leo Kanner(1). Kanner used the term early infantile autism to convey what he appeared to be one of the central defining features of the condition, i.e., autism or lack of interest in other people. Kanner was careful to frame his observation of this social deviance within a developmental context noting Gessel's report of the early social interests and abilities of normally developing children. In the subsequent fifty years the syndrome has captured the attention of investigators from diverse disciplines in part because the syndrome challenges us to think about the role of social factors in child development. This interest is similar, in some respects, to that of earlier generations of child developmentalists who hoped to learn about the nature of what was truly human by studying so called wild or "feral" children(2). The social disabilities of autistic individuals remain the most striking, and probably the least understood, aspect of the autistic syndrome (3).

It is perhaps best to begin with a very brief review of why social development does indeed seem to be of very central interest in autism. Firstly, as Kanner noted the social deficits of autistic individuals appear to be of very early onset - stemming from the first days, weeks, or months of life and

apparently only very, very rarely developing after age 3 (4). Secondly, it became apparent that autism can not be accounted for on the basis of deviant parent-child interaction or other markedly deviant experiences and appears to more likely reflect some central nervous system disturbance (5). Thirdly, definitions of autism and empirical studies of taxonomy have consistently emphasized the centrality of social deficits in the definition of the syndrome (6). Fourthly, even though some gains in social interest and skills are noted over the course of development even the highest functioning individuals with autism have marked problems with social interaction (7).

Although viewed as "primary" for purposes of syndrome definition, disturbances in social development were viewed as secondary to other processes. Theoretical models of the condition have thus emphasized such varied features as disturbances in perception (8), language (9), cognition (10), or arousal (11) in the pathogenesis of autism. These views reflect an awareness that some social skills do emerge over the course of development(3) and that social responsiveness in individuals with autism can be systematically increased by various interventions (12). It is clearly the case that most (perhaps 80%) of individuals with autism are also mentally retarded and that developmental level is a very potent predictor of ultimate outcome although, on the other side, the social deviance observed in autism has been widely assumed to be **greater** than that expected on the basis of mental age alone (3). In part

reflecting the importance of cognitive abilities for ultimate outcome an implicit "cognitive primacy hypothesis" (13) has often been assumed - i.e., children's cognition are emphasized relative to the role of social factors in development. Clearly the fact that some social interest and some social skills develop need not, necessarily, imply that cognitive factors are "primary". Similarly, certain cognitive skills may be relatively preserved although this does not suggest that cognitive factors are less important to syndrome pathogenesis. The observation that some social skills emerge may just as parsimoniously be taken to suggest the importance of attempting to disentangle precisely those aspects of social development that are most uniquely disordered in autism (14).

More recently, the social impairment in autistic children has been conceptualized in terms of a very specific, and primarily cognitive, incapacity to impute mental states to others and to self (15,16). This circumscribed, but pervasive, cognitive deficit is hypothesized to account for the social and communicative dysfunction in autism, as well as for the lack of empathy and dearth of pretend play exhibited (17). This approach has grown out of experimental findings in which autistic children, in contrast to mentally retarded and normally developing children, were shown to be unable to attribute a false belief to others or to understand picture stories which required a grasp of people's "Intentions" as defined as "the entire range of mental states with content"; in this regard autistic children

were said to lack a "theory of mind" i.e., an implicit capacity which involves "the person postulating the existence of mental states and then using these to explain and predict another person's behavior" (18). In Leslie's (19) view, this capacity implies a need to represent other people's representations; accordingly, the implicit "theory of mind" requires the usage of "second-order representations" or "meta-representations". And it is this specific cognitive skill which is postulated to be at fault in autistic individuals. Devoid of a "metarepresentational" capacity they cannot symbolize the world around them, hence the impairments, for example, in pretend play and empathy and social cognition in general. The importance of this new approach lies in its increased attention to social development in autism. However, its usefulness is still somewhat limited at present due to the fact that various predictions regarding the nature of autistic social dysfunction which are apparently implied by this hypothesis have yet to be fully evaluated empirically. In this presentation we wish to focus on two apparent predictions of the Theory of Mind Hypothesis as it relates to autistic social dysfunction.

The first prediction concerns the issue of whether the social deficits found in autism are "primary" - i.e. a direct result of an underlying constitutional etiology, or "secondary" - i.e. an underlying result of other symptomatic features of the syndrome, such as specific patterns of cognitive impairment (5). In Kanner's (1) original report, the autistic inability to relate

to others is primary and presumably present from birth. In contrast, the Theory of Mind hypothesis implies that the social deficits in autism are secondary in nature, and a result from a failure of maturation of the metarepresentational skills presupposed by normal social functioning. Autistic social impairment should, therefore, be apparent at the point in development in which metarepresentational skills emerge in normally-developing infants. This would also suggest that social functioning in autistic children should unfold normally until that point in development in which infants acquire the ability to conceive of other people's representations. The issue of exactly when this capacity emerges is somewhat unclear. Although the original description (19) postulated that pretense (as in pretend play) was possibly the earliest manifestation of the capacity to conceive of other people's mental states with content, more recent descriptions consider earlier behaviors such as gestural communication and joint attention as evidence for the infant's use of at least a rudimentary metarepresentational capacity (20). Thus the postulated age of emergence of theory of mind has ranged from during the second year of life to the 11th or 12th month or perhaps as early as the 8th-10th month (if joint visual attention is assumed to indicate some metarepresentation).

This view is, however, inconsistent with important aspects of syndrome expression in autism. In the first place, as noted by Kanner(1) many autistic children are noted by their parents to exhibit marked abnormalities in social development from the first

days or weeks of life; these abnormalities include a range of behaviors otherwise observed in normally developing infants well before age 8 months (3). In this regard the TOM hypothesis would seem to suggest that early developing social behaviors should not differentiate between autistic children and other children of comparable mental functioning. On the other hand, if Kanner's original hypothesis is correct abnormalities in early social functioning should be present in the first months of life.

A second prediction derived from the Theory of Mind hypothesis concerns the issue of whether autistic social dysfunction is generalized (i.e. it disables all skills necessary for interacting with others) or discrete (i.e. it disables only certain social skills as a result of the rather specific cognitive impairment). This is a complex issue for several reasons: (a) far from being a homogeneous group, autistic persons vary widely in the severity and range of their social disabilities, (b) some social skills do emerge over development; and, most important, (c) it is clear that, with the possible important exception of autism, social, communicative and cognitive skills emerge in a highly interrelated fashion over the course of development.

One might minimize these confounding variables by focusing on the early social development of autistic children. From this standpoint, Kanner's (1943) initial description views the social abnormalities in autism as a generalized phenomenon, not only present from the beginning of life, but also affecting very early

and basic social contacts such as babies' anticipatory posture upon being picked up and body molding to caregivers - capacities not so clearly related to metarepresentation skills. In contrast, the Theory of Mind hypothesis apparently predicts that some social behaviors may not be impaired in autism and thus would seem to assume a rather more circumscribed deficit. Accordingly, one should expect that autistic children should fail to exhibit social behaviors mediated by the metarepresentational capacity, whereas social behaviors with no such demands should be observed in their social functioning.

Although various clinical features of autistic persons (e.g. pragmatic deficits, dearth of pretend play, lack of empathy, etc) have been accounted for in terms of the metarepresentational disability (18), the evidence in support of the Theory of Mind hypothesis has been derived from experimental studies limited, by the nature of the experimental tasks, to the "higher functioning" individuals with autism.

We collected data to address the issue of whether the social deficit in autism appeared relative to normative social behaviors, i.e., whether social deficits were noted in behaviors that would typically be expected **before** metarepresentational capacities emerge and whether such deficits, again assessed through analysis of normative social behaviors, were generalized or discrete in nature (21).

The Revised Vineland Adaptive Behavior Scales (22) assess capacities for personal and social sufficiency in various

domains/subdomains of functioning including Communication, Daily Living Skills, Socialization, and Motor Skills. These capacities are assessed on the basis of the individual's current, daily functioning using a semi-structured interview administered to a parent or other primary caregiver. The Revised Vineland was nationally standardized using a sample of 3000 individuals (from birth to adulthood) matched to the 1980 U.S. census for region of country, size of community, race/ethnicity, and level of parental education.

The issues addressed by the present study were the following: (1) the extent to which social deficits in young autistic children are generalized or discrete (i.e. only social skills which presuppose metarepresentational capacities are affected) in nature; (2) the extent to which social deficits in these children are "primary" (i.e. apparent prior to the time that metarepresentational capacities emerge) or "secondary" in nature; and (3) the extent to which social deficits exhibited by young autistic children are specific to autism or reflect general developmental delay.

Vineland Socialization item scores were obtained for groups of autistic and non-autistic, developmentally disabled children who were individually matched in chronological age (CA), mental age (MA), and IQ. Given the varying degrees of mental retardation presented by autistic children, the analysis was cast in a developmental context, i.e. social skills were expected to be present following a MA equivalent (rather than a CA) progression.

The Vineland standardization data were used to provide median ages of acquisition in the normal population (22). A socialization disability was defined as such only if social development lags behind mental development.

In order to examine the syndrome specificity of social deficits in developmentally disabled children with a low mental age, Vineland Socialization scores were obtained for the same groups of developmentally disabled children. Vineland Motor Skills scores were also obtained in order to provide a comparison between social and non-social aspects of adaptive development.

Scores for the Socialization and Motor Skills domains of the Vineland were obtained for 58 children less than 7 years of age seen for comprehensive evaluation. The sample was divided into two groups according to diagnosis. Children in the autistic group (N=29, 22 boys and 7 girls) met both DSM-III (APA,1980) and DSM-III-R (APA,1987) criteria for infantile autism/autistic disorder. The non-autistic group (N=29, 20 boys and 9 girls) included children with primary diagnoses of mental retardation (N=15), developmental language disorders (N=12), or other specific developmental disorders (N=2). Chronological age (CA), mental age (MA) equivalent and IQ scores for the two groups are presented in the next slide. The two groups did not differ significantly in CA, MA or IQ. The mother or both parents were interviewed using the Vineland Survey Form by interviewers not aware of the subject's diagnosis.

Item scores of the Socialization domain were used for

statistical comparisons between the two groups. Only subjects with MA equal or higher than the median age obtained in the national standardization sample for the specific item were included for each item analyses. Given the low MA characterizing the groups, only the first twenty items were utilized. These twenty items belong to either the "Interpersonal Relationships" (how the child interacts with others) or "Play and Leisure Time" (how the child plays and uses leisure time) subdomains of the Socialization section. Scores for each item were collapsed into 2 dichotomized categories - not usually exhibited vs. usually exhibitied. For each of the 2 x 2 contingency tables a series of statistical analyses were performed including Fisher's exact test and the phi coefficient r_ϕ which measures the association of the item with diagnostic group (23).

The specificity of autistic social dysfunction was examined by calculating standard scores for the Socialization and Motor Skills relative to both MA and CA (the latter being the standard procedure). The MA-based standard scores allowed us to compare the groups for social dysfunction (and motor development) which was in excess of the level of impairment expected given the level of mental capacities.

The next slide lists the results of analyses performed for the twenty contingency tables corresponding to the first twenty items of the Vineland Socialization domain. In the sample, 9 of the 20 items clearly differentiated the autistic children from the nonautistic, developmentally disabled controls at $p < .01$. Of

these items, 6 were reported to be performed before the age of 8 months in the Vineland standardization sample.

The next slide lists the comparisons of CA-based and MA-based Vineland Socialization and Motor Skills scores for the 29 pairs of autistic and non-autistic children who were matched in CA, MA and IQ. A significant difference for both CA- and MA-based Socialization mean scores of the autistic and nonautistic children was observed ($N=58$, $U=120.5$, $p<0.001$, and $U=212$, $p<0.001$, respectively). In both comparisons, standard scores for the autistic children were significantly lower than the ones obtained for the nonautistic, control group, i.e. even when viewed relative to mental, rather than chronological, age.

A comparison between CA-based Motor Skills standard scores revealed no statistically significant difference between the two groups. As might be expected, however, given the typical adaptive development of autistic children, the autistic group's MA-based Motor Skills standard scores were significantly higher than those of the control group ($t=2.013$, $df=56$, $p<0.05$).

Thus almost half of the first twenty items of the Socialization Domain of the Vineland significantly discriminated between a group of autistic and a group of non-autistic developmentally disabled children who were matched according to stringent CA, MA and IQ criteria, and who were included in the analysis only if the level of mental functioning of the matched-pairs exceeded norm-referenced MA equivalent for the specific social behavior. Most of these items refer to very basic social

behaviors such as showing anticipation of being picked up by caregiver, or showing affection toward, or interest in, other people. Of more interest, however, (and indeed, an important reminder to the diagnostician working with young autistic children), is the fact that such unequivocal expressions of social sensitivities are evidenced in normally-developing children from very early babyhood. Six early-emerging social behaviors which discriminated autistic children from their controls in the present study, were observed in half of the standardization population prior to the age of 8 months (range <2 to 7 months). The remaining 3 items which were shown to have discriminative value were typically exhibited at the age of 8 to 11 months.

While these data cannot address the issues of whether different processes underlie the acquisition or function of social behaviors in autism they do suggest that very eary social development is autism is, consistent with Kanner(1) indeed abnormal. While it is important to keep in mind that the Vineland was not developed as an instrument for assessment of autism as such it was of interest that of the twenty Socialization items studied the discriminative value was highest for behaviors involving very basic social interaction and lower when items were rather less interactive in nature.

In sum, these results appear to indicate that, in contrast to predictions derived from the Theory of Mind hypothesis, social deficits in autism include very basic and early-emerging socially

adaptive behaviors which are typically present in normally-developing infants prior to the time at which even the most basic metarepresentational skills are thought to emerge. In this sense, our results are consistent with Kanner's original emphasis on the primacy of social dysfunction in autism, which can be seen as an alternative hypothesis to the cognitive one. According to our results, autistic social deficits are both pervasive, and "primary" (i.e. occur early in the developmental sequence), rather than being circumscribed to social behaviors mediated by metarepresentational skills, or "secondary" to a cognitive impairment presumably apparent in the last quarter of the first year of life, as predicted by the Theory of Mind hypothesis.

Given that issues related to the nature and pathogenesis of autistic social deficits have not, as yet, been comprehensively addressed by propounders of the Theory of Mind hypothesis, the above conclusions are couched on the following qualifications. Firstly, it is important to note that some autistic children were reported to show the behaviors that significantly differentiated the autistic group from the nonautistic, developmentally disabled children. This finding would suggest the existence of at least two subgroups of children in terms of the pathogenic path of autistic social dysfunction. However, the suggested subgroup of autistic children who exhibited the various social behaviors characteristic of a normally developing infant's first 7 months of life is actually smaller than it would appear. Only 8 of the 29 autistic children displayed all items up to item

8 with an age equivalent of 4 months and only 5 of the 29 displayed all items up to item 11 (age equivalent of 6 months); and only 2 of the 29 displayed all items up to the age equivalent of 7 months. Therefore, there was considerable scatter in these children's social development profile. This finding notwithstanding, the fact that at least some autistic children displayed these behaviors consistently according to parent report, suggests the possibility that for this reduced number of children a theory of mind deficit might be primary.

Secondly, the present study adopted a conservative approach, according to which, those social behaviors which developmentally precede the advent of metarepresentational skills do not presuppose such skills. We chose not to adopt an alternative approach according to which social behaviors are dichotomized as requiring (or not) metarepresentations, regardless of developmental considerations. This could, in principle, be accomplished by deducing the cognitive prerequisites of the studied behavior. For example, genuine desire to please caregiver would appear more likely to require representations of the caregiver's mental representations than reaching for a familiar person. However, even though a consensual distinction might be reached for a specific behavior, unequivocal decisions cannot be easily made because there are typically various routes to accomplish many (and, particularly, early) social behaviors. Thus, a child might acquire a social skill by rote instruction, or rigid associations, without making use of metarepresentational

skills (e.g. the echoing of sentences devoid of communicative intent). Such an approach might be viable in regard to late-emerging social skills (e.g. genuine make-believe activities, refraining from embarrassing others, etc.), since it seems unlikely that such behaviors could be displayed by a metarepresentationally-impaired person. However, the application of this approach in the case of early social development awaits the development of an operational method rendering possible the dichotomization of early social behaviors into those mediated, or not, by metarepresentational skills.

The third qualification concerns our adoption, following Baron-Cohen (20), of the emergence of joint visual attention as the earliest indication of an, as yet rudimentary theory of mind. Although in Scaife and Bruner's study (24), the majority of infants showed evidence of an ability to follow changes in adult gaze direction by 8-10 months, 30% (N=10) of them had already shown this ability at age 2-4 months. For the sake of consistency, one would have to attribute a theory of mind to these young infants. Whether or not this attribution is valid depends, ultimately, on the cognitive prerequisites of a theory of mind. Leslie (19) argues that representations of other peoples' representations are its building blocks. At present, however, there is little evidence that infants of that age possess such advanced cognitive skills. In contrast, Baron-Cohen (17) makes the assumption that "the development of a theory of mind reflects a specific biological change in the brain" (p.85).

In this sense, autism is hypothesized as a "specific cognitive disorder of 'mind-blindness'". There cognitive prerequisites of the ability to conceive of other people's minds remain rather unclear and their absence allows for the possibility that the rudiments of a theory of mind emerge earlier than the age of 8-10 months. It is important, however, to note that as the boundaries of a cognitive theory of mind are moved progressively earlier in development the hypothesis faces the challenge of differentiating itself, empirically, from Kanner's original affective hypothesis of autism. Devoid of a psychogenetic account (25) of the cognitive capacity to conceive of other people's minds, and unable, as yet, to ground the hypothesis on neurobiological processes of brain maturation, the pathogenic account of autism provided by this version of the Theory of Mind hypothesis is still of only limited applicability.

Although our results fail to support some predictions derived from the Theory of Mind hypothesis, it is important to emphasize that they do not invalidate the hypothesis as a whole. This new conceptualization of social-cognitive development has been instrumental in re-focusing investigators' attention on the social aspects of the autistic disorder. It also encapsulates in a single concept the lack of social sensitivity, understanding and adjustment which are unique to individuals presenting this disorder.

REFERENCES

1. Kanner,L. (1943). Autistic disturbances of affective contact. Nervous Child, 2, 217-250.
2. Zingg,R.M. (1940). Feral man and extreme cases of isolation. American Journal of Psychology, 53, 487-517.
3. Volkmar, F.R. (1987). Social Development. In D. J. Cohen and A. Donnellan, (ed.), Handbook of Autism and Pervasive Developmental Disorders. Wiley: New York, pp. 41-60.
4. Volkmar, F.R., Stier, D. & Cohen, D.J. Age of Recognition of Pervasive Developmental Disorder. American Journal of Psychiatry, 142: 1450-1452, 1985.
5. Fein,D., Pennington,B., Markowitz,P., Braverman,M. & Waterhouse,L. (1986). Towards a neuropsychological model of infantile autism: Are the social deficits primary? Journal of the American Academy of Child Psychiatry, 25, 198-212.
6. Siegel, B., Vucicevic, J., Elliot, G., and Kraemer, H. (1989). The use of signal detection theory to assess DSM-III-R criteria for autistic disorder. Journal of the American Academy of Child and Adolescent Psychiatry, 28: 542-548.
7. Volkmar, F.R. and Cohen, D.J. (1985) A First Person Account of the experience of Infantile Autism by Tony W. Journal of Autism and Developmental Disorders, 15: 47-54.
8. Ornitz, E.M. and Ritvo, E.R. (1968). Perceptual inconstancy in earlyinfantile autism. Archives of General Psychiatry, 18: 76-98.
9. Rutter, M., Bartak, L. and Newman, S. (1971). Autism--a central disorder of cognition and language. In M. Rutter (ed), Autism:Concepts, Characteristics and Treatment. London: Churchill-Livingstone, pp. 148-171.
10. Prior, M.R. (1979). Cognitive abilities and disabilities in infantile autism: A review. Journal of Abnormal Child Psychology, 7: 357-380.
11. Richer, J. (1976). The social avoidance behavior of autistic children. Animal Behavior, 24: 898-906.
12. Churchill, D. and Bryson, C.Q. (1972). Looking and approach behavior of psychotic and normal children as a function of adult attention or preoccupation. Comprehensive Psychiatry, 13: 171-177.
13. Cairns, R. B. (1979). Social development: The origins and plasticity of interchanges. San Francisco: Freeman.
14. Rogers, S.J. and Pennington, B.F. (1991). A theoretical approach to the deficits in infantile autism. Development and Psychopathology, 3:137-162.
15. Leslie,A.M. (1987). Pretense and representation: The origins of "Theory of Mind". Psychological Review, 94, 412-426.
16. Baron-Cohen,S. (1989). The autistic child's theory of mind: A case of specific developmental delay. Journal of Child Psychology and Psychiatry, 30, 285-297.
17. Baron-Cohen,S. (1990). Autism: A specific cognitive disorder of "mind-blindness". International Journal of Psychiatry, 2, 81-90.

18. Baron-Cohen,S. (1988). Social and pragmatic deficits in autism: Cognitive or affective? Journal of Autism and Developmental Disorders, 3, 379-402.
19. Leslie,A.M. & Happé,F. (1989). Autism and ostensive communication: The relevance of metarepresentation. Development and Psychopathology, 1, 205-212.
20. Baron-Cohen,S. (1989). Perceptual role taking and protodeclarative pointing in autism. British Journal of Developmental Psychology, 7, 113-127.
21. Klin, A., Volkmar, F.R, and Sparrow, S. (1992), The development of individuals with autism: implications for the Theory of Mind Hypothesis. Journal of Child Psychology and Psychiatry, 15: 317-331.
22. Sparrow,S., Balla,D., & Cicchetti,D. (1984). Vineland Adaptive Behavior Scales (Survey Form). Circle Pines, Minn.: American Guidance Service.
23. Siegel,S. & Castellan,N.J.,Jr. (1988). Nonparametric statistics for the behavioral sciences (2nd ed.). New York: McGraw-Hill.
24. Scaife,M. & Bruner,J.S. (1975). The capacity for joint visual attention in the infant. Nature, 253, 265-266.
25. Piaget,J. The principles of genetic epistemology. London: Routledge & Kegan Paul.

Selected Slides:

Kanner: "Early Infantile Autism"

Congenital disturbance in affective contact
2 essential features: 1) autism
2) "resistance to change"

Social Development in Autism

1. Disturbance of very early onset
2. Does not reflect disturbed environment
3. Social deficits central in definition
4. Social deficits not just 2^{o} MA
5. Highest functioning adults have marked problems in social interaction

"Core" Deficits in Autism

1.	Social	- Kanner
2.	Perception	- Ornitz & Ritvo
3.	Language	- Rutter, et al.
4.	Cognitive	- Prior
5.	Arousal	- Richter

Arguments Against Centrality of Social Deficits

Some social skills (highly deviant) emerge
Level of MR is potent predictor of outcome
Implicit "Cognitive Primacy Hypothesis"

Theory of Mind (TOM) Hypothesis in Autism

Circumscribed but pervasive cognitive deficit
Experimental work: verbal autistic individuals
Lack capacity to postulate existence of mental states and use these to explain/predict the behavior of another person
Second order "meta" representations required

Theory of Mind Predictions

Are social deficits "primary" or "secondary"
Are social deficits "discrete" or "generalized"
When do social deficits appear?

Methods

Socialization items -first 20 items - Vineland
Autistic vs. nonautistic but Devel. Disordered Ss
Subjects matched on MA (various tests)
Subjects included in analyses only if MA $\geq$ Vineland item age

Vineland Socialization Items (1-20)

01. Looks at face of caregiver
02. Responds to voice of caregiver or another person
03. Distinguishes caregiver from others
04. Shows interest in novel objects or new people
05. Expresses two or more recognizable emotions
06. Shows anticipation of being picked up
07. Shows affection toward familiar people
08. Shows interest in children or peers (nonsiblings)
09. Reaches for familiar person
10. Plays with toy/other object alone or with others
11. Plays very simple interaction games
12. Uses common household objects for play
13. Shows interest in activities of others
14. Imitates simple adult movements
15. Laughs/smiles appropriately
16. Addresses $\geq$ 2 familiar people by name
17. Shows desire to please caregiver
18. Participates $\geq$ one game or activity with others
19. Imitates complex task hours later
20. Imitates adult phrases heard previously

Vineland Adaptive Behavior Scales

Domains and Subdomains	Content
Communication	
Receptive	What the individual understands
Expressive	What the individual says
Written	What the individual reads & writes
Daily Living Skills	
Personal	How the individual eats, dresses, and practices personal hygiene
Domestic	What household tasks the individual performs
Community	How the individual uses time, money, the telephone, and job skills
Socialization	
Interpersonal	How the individual interacts with others
Play and Leisure Time	How the individual plays and uses leisure time
Coping Skills	How the individual demonstrates responsibility/sensitivity to others
Motor Skills	
Gross	How the individual uses arms and legs for movement/coordination
Fine	How the individual uses hands and fingers to manipulate objects
Adaptive Behavior Composite	A composite of Communication, Daily Living Skills, Socialization, and Motor Skills domains

Sample Characteristics and **t** Tests

	Autistic			Non-Autistic					
	N	X	S.D.	N	X	S.D.	t	df	p<
Age	29	4.31	1.35	29	4.02	1.63	0.74	56	NS*
Mental age	29	1.81	0.90	29	2.11	0.81	1.33	56	NS
IQ	29	45.93	14.35	29	52.41	19.70	1.43	56	NS

* No significant difference.

Fisher's p/r_ϕ Vineland Socialization Items (1-20)

Items	N+/Ntotal Aut	N+/Ntotal Nonaut	MA "cut-off" yrs-mths	Fisher's Exact p=	r_ϕ
01 (IR)♦	27/29	29/29	<0-2	.2456	.189
02 (IR)	29/29	29/29	<0-2	.9999	-
03 (IR)	25/29	29/29	<0-2	.0559	.272
04 (PLT)♦	19/29	26/29	<0-2	.0281 *	.289
05 (IR)	27/29	29/29	<0-2	.2456	.189
06 (IR)	20/29	28/29	<0-2	.0059 **	.365
07 (IR)	16/29	29/29	0-4	.0000 ***	.537
08 (PLT)	13/29	27/29	0-4	.0000 ***	.521
09 (IR)	17/29	28/29	0-5	.0000 ***	.455
10 (PLT)	25/29	27/29	0-5	.3350	.113
11 (PLT)	13/29	28/29	0-6	.0000 ***	.568
12 (PLT)	19/29	25/28	0-7	.0327 *	.283
13 (PLT)	12/29	22/28	0-8	.0044 **	.379
14 (IR)	13/29	24/28	0-7	.0012 **	.428
15 (IR)	12/26	23/27	0-11	.0030 **	.412
16 (IR)	10/26	22/27	0-11	.0015 **	.530
17 (IR)	8/21	14/24	1-3	.1454	.202
18 (PLT)	7/16	18/23	1-7	.0307 *	.354
19 (IR)	8/18	14/24	1-6	.2812	.137
20 (IR)	3/12	12/19	1-11	.0433 *	.372

*p<.05, **p<.01, ***p<.001

CA-based and MA-based Socialization and Motor Skills scores

Domain	Autistic N	Autistic X	Autistic S.D.	Nonautistic N	Nonautistic X	Nonautistic S.D.	U	t	p<
CA-based Socialization	29	53.89	7.76	29	69.27	12.55	120.5		0.001
MA-based Socialization	29	78.89	12.61	29	95.20	20.22	212.0		0.001
CA-based Motor Skills	29	67.79	19.77	29	68.06	19.72		0.957 (df=56)	NSD
MA-based Motor Skills	29	120.34	22.61	29	108.875	20.63		2.013 (df=56)	0.05